THE ANNALS

AND

MAGAZINE OF NATURAL HISTORY.

[FIFTH SERIES.]

No. 47. NOVEMBER 1881.

XXXII.—*On Hair-worms in the Collection of the British Museum.* By Dr. L. Örley.

[Plate XVIII.]

The determination of the various species of the Gordiidæ has been much facilitated by Villot's excellent monograph *, in which all the species as yet known are described. About thirty-five were already distinguishable, without paying any attention to the number of varieties included by Diesing in his 'Systema Helminthum,' and which he himself allowed to drop in his "Revision der Nematoden" †. But even among these thirty-five fairly distinguishable species, some are so inadequately described that one might very easily regard them as synonyms; meanwhile, however, we must allow them to stand as distinct species until they shall have been re-examined.

The collection of Gordiidæ in the British Museum is a very good one, as it comprises nearly half the known species, the majority of which are represented by both male and female specimens. Schneider's ‡ assertion that the males in *Gordius* preponderate over the females is a statement that I cannot corroborate; on the contrary, I find that the female specimens predominate, and only in *Gordius subbifurcus* does there

* Archives de zool. expérim. t. iii. (Paris, 1874).

† Sitzungsb. d. k. Akad. d. Wissensch. Wien, 1861, Band xlii. no. 28.

‡ Monographie der Nematoden: Berlin, 1866.

appear to be a preponderance of males. Generally speaking, it is impossible to establish a fixed rule in this matter, either from the form or size of the body, as in certain species it is sometimes the males and at other times the females that attain the greater length. As the existing species are not represented by very many examples, I have not been able to submit any specimens to anatomical investigation, and have been obliged to content myself with a study of their external characters. I have, however, subjected the cuticula of each species to microscopical examination, and grouped them in accordance with the structure of this layer; it is, indeed, the one characteristic feature which, as the best, and, in fact, only practicable one, has been always adopted up to this time. I must remark that the cuticula separated from the muscular system has not been treated with any reagents, as its structure is best observed under water. Indeed it is generally impossible to determine species properly without a knowledge of the structure of their cuticula; and I have therefore given the microscopical structure of the same both in the case of the new species and of Baird's type specimens *.

I find it also desirable to add a table for identifying the existing species in the collection, and to characterize them briefly according to their most striking points. In addition to the literature of the subject, I have given an account of the localities where the specimens were found. This last presents much that is interesting in regard to the geographical distribution of the Gordiidæ, as the same species is found in different zones.

The species are generally divided into two groups, according to the structure of the cuticula, viz. into those that are smooth and those that are granulated. A closer microscopical investigation establishes this, and at the same time enables us to form a more exact division. I arrange the Gordiidæ in two groups, according as the cuticula consists of only one system of lines crossing each other, or, on the other hand, these lines are either wanting or along with the papilliform granulation compose the cuticula. The first group is divided into those that have cross lines, and those that have, together with these, a facetted network (fig. 3). The second group contains species in which either the whole cuticula consists of papilliform granulations (fig. 4), or where they are dispersed, and consequently have the appearance of being imbedded in an intermediate substance (figs. 5 and 7).

* 'Catalogue of the Species of Entozoa contained in the Collection of the British Museum' (London, 1853); and 'Proceedings of the Zoological Society of London,' 1853, pp. 20 & 21.

Table for determining the Species.

- **Cuticle smooth, marked out into spaces by intercrossing lines ..**
  - Circular elevations and depressions behind the head .....
    - Semicircular depressions giving rise to a superficial segmentation; no longitudinal lines ..... *fasciatus.*
    - No superficial segmentation; two brownish longitudinal lines .... *fulgur.*
  - No circular elevations..
    - Extremities of the body rounded
      - Superficial segmentation ..... *aquaticus.*
      - No superficial segmentation.... *æneus.*
    - Posterior extremity spoon-shaped in female ..... *platyurus.*
    - Posterior extremity club-shaped in female ..... *sphærurus.*
- **Cuticle smooth, with facetted spaces in addition to the intercrossing lines ..**
  - Cuticle with light brown spots ..... *pustulosus.*
  - No spots .....
    - Sides of facettes dotted ..... *violaceus.*
    - No dots ..... *subbifurcus.*
- **Cuticle with papillæ .....**
  - Papillæ separated by interspaces .....
    - Equal, short .....
      - Posterior extremity of female with three lobes, subequal in breadth ..... *gratianopolensis.*
      - One lobe narrower and styliform *trilobus.*
    - Of different sizes, higher and broader .....
      - Body slightly swollen at both ends..... *diblastus.*
      - Body pointed anteriorly; cuticle very thick ..... *pachydermus.*
  - Cuticle closely set with papillæ of various sizes ..... *verrucosus.*

The characters for distinguishing the species must be looked for in the form of the head and in the end of the tail, as well as in the lines crossing the whole length of the body, which are either wanting or appear single or double. The colour of the cuticula, as also the length of the body, are insufficient to determine the species, as, according to our knowledge, one and the same species may exhibit the most different tints and sizes. The form of the body is so similar that it is not available for the purpose of determination.

1. *Gordius fasciatus*, Baird. (Pl. XVIII. fig. 1.)

Gordius fasciatus, Baird, Proc. Zool. Soc. xxi. (1853) p. 21; id. Ann. & Mag. Nat. Hist. ser. 2, xv. p. 72; Diesing, Revision d. Nem. p. 602; Villot, Monogr. d. Drag. p. 53.

Length 28 centim.; breadth 1 millim.

Anterior extremity as well as posterior of a very dark colour, almost black, and roughened with raised circular ridges, which extend for about 3 lines. Only one specimen (female).

Hab. North America.

2. *Gordius fulgur*, Baird. (Pl. XVIII. fig. 2.)

Gordius fulgur, Baird, Ann. & Mag. Nat. Hist. ser. 3, vii. p. 229.

This gigantic species was collected by Wallace, and named and briefly described by Baird. It is very interesting to me to have discovered several of this species in unnamed bottles from different localities, and moreover to have found the male, which was hitherto unknown to science.

The belief that this worm is luminous is highly probable, its iridescent property proceeding from the crossing lines of the cuticle, which cause also a luminosity in *Lumbricus* and *Piscicola*. The people of Batchjan, moreover, call it the "lightning-snake."

Female: length 100–160 centim.; breadth 1–1·5 millim.

Male: length 40–70 centim.; breadth 1 millim.

The body is of the same breadth throughout, somewhat flattened, with two dark lines running along the sides of its whole length. The free end of the head is thinner than the other extremity; but both are rounded off; the postcephalic region is ringed, as in *G. fasciatus*. The cuticle is very firm, and is marked by lines crossing one another, which are generally set nearly at right angles. The hinder extremity of the male has two lobate processes, swollen at their free ends, and nearly touching; the thickening in the region of the sexual aperture is conspicuous. The males are much thinner and smaller than the females, and nearly quite flat.

Hab. Batchjan ("This curious Annelid is found on the ground in the forests of Batchjan, twisted among dead leaves or twigs."—*Wallace*); Celebes; Nepaul (*coll. by B. H. Hodgson, Esq.*); River Nikko, Central Japan.

3. *Gordius aquaticus*, Linné.

Complete literature in Baird's 'Catalogue of Entozoa,' p. 35.

Hab. Freshwater ponds, ditches, and slow-running streams. Europe.

4. *Gordius æneus*, Villot.

Gordius æneus, Villot, Monogr. d. Drag. p. 52.

Female, length 55 centim.; male, length 25 centim.

Body cylindrical, tapering but very slightly at extremities. Anterior extremity rather narrower than posterior. The tail of the male has two lobate processes with short spines at their ends. The thickening in the region of the sexual aperture is inconspicuous.

Hab. Cumana (Venezuela) and South Africa.

5. *Gordius platyurus*, Baird.

Gordius platyurus, Baird, Cat. of Ent. in Brit. Mus. p. 36; id. Proc. Zool. Soc. 1853, p. 20; id. Ann. & Mag. Nat. Hist. ser. 2, xv. p. 71; Diesing, Revision d. Nem. p. 601; Villot, Monogr. d. Drag. p. 52.

Body of a uniform dull white colour, narrower at anterior extremity and terminating in a broad flattish tail, which is slightly bifid.

Male unknown.

Hab. Jamaica.

6. *Gordius sphærurus*, Baird.

Gordius sphærurus, Baird, Catal. of Entozoa in Brit. Mus. p. 112; id. Proc. Zool. Soc. 1853, xxi. p. 21; id. Ann. & Mag. Nat. Hist. ser. 2, xv. p. 72; Diesing, Revision d. Nematoden, p. 601; Villot, Monogr. d. Drag. p. 56.

Female and male, length 36–40 centim., breadth 1–1½ millim.

Posterior extremity bluntly rounded and marked across with a rather elongated depression. The tail of the female is somewhat swollen and club-shaped. The tail of the male has two lobate processes; the lobes are equally broad, and the interval between them distinct. The thickening in the region of the sexual aperture conspicuous.

Hab. Khassya hills, India.

7. *Gordius pustulosus*, Baird.

Gordius pustulosus, Baird, Cat. Entoz. p. 37; id. Proc. Zool. Soc. 1853, p. 20; id. Ann. & Mag. Nat. Hist. ser. 2, xv. p. 72; Diesing, Revision d. Nem. p. 602; Villot, Monogr. d. Drag. p. 56.

Female, length 20–22 centim.

Tapering considerably at anterior extremity, and becoming gradually thicker at inferior. Along the whole length of the body, on each side, runs a pretty deep sulcus, interrupting the circular lines.

Hab. Abdomen of *Blaps obtusa*. Europe.

8. *Gordius violaceus*, Baird.

Gordius violaceus, Baird, Cat. Entoz. p. 36; id. Proc. Zool. Soc. 1853, p. 20; id. Ann. & Mag. Nat. Hist. ser. 2, xv. p. 71; Diesing, Revision d. Nem. p. 604; Villot, Monogr. d. Drag. p. 60.

Female, length 26–30 centim.

This species is closely allied to *G. subbifurcus*, and not to *G. aquaticus*, as Diesing supposed.

Body tapering slightly at upper extremity, and gradually becoming thicker at inferior. Along the whole length of the body, on each side, runs a pretty deep sulcus, interrupting the circular lines.

Hab. France; Germany (?).

9. *Gordius subbifurcus*, Meissner (= *G. tolosanus*, Duj.). (Pl. XVIII. fig. 3.)

Complete literature in Baird's 'Catalogue of Entozoa.'

Hab. Freshwater ponds and slow-running streams.

10. *Gordius gratianopolensis*, Charvet. (= *G. tricuspidatus*, Meissner). (Pl. XVIII. fig. 5.)

Filaria tricuspidata, L. Dufour, Ann. d. Sc. Nat. 1828, p. 222.
Dragonneaux de Claix, Charv. Nouv. Ann. du Mus. iii. pp. 36–44.
Filaria Grylli bordigalensis, Sieb. Stettin. entom. Zeitung, 1872, p. 154.
Gordius grution, Ch. Diesing, Syst. Helm. ii. p. 106.
Gordius tricuspidatus, Meissner, Zeitschr. f. wiss. Zool. vii. p. 55; Schneider, Monogr. d. Nematoden. Berlin: 1866.

Only one specimen (female).

Hab. Ceylon.

11. *Gordius trilobus*, Villot.

Gordius trilobus, Villot, Monogr. d. Drag. p. 59.

Female, length 30 centim.

The hinder extremity of the female has three lobate processes, somewhat rounded at their free ends and closely touch-

ing. One lobe narrower and styliform. I am not quite certain whether our specimen is quite identical with the species of Villot; for he mentions nothing specially of the form of the extremity of the tail, and in our specimen the unequal lobe is so much narrower that it might be rather called a rod than a lobe. The lobes are so closely united that one can hardly distinguish them with the naked eye. In other respects it agrees with Villot's description.

Hab. Lima (Peru).

12. *Gordius diblastus*, n. sp. (Pl. XVIII. fig. 6.)

Female, length 40 centim.; male, length 16–20 centim.

Body slender, tapering at both extremities, especially posteriorly. The extremities are somewhat swollen and button-shaped. The tail of the male has two lobate processes of nearly equal thickness throughout their whole length. Thickening in the region of genital aperture inconspicuous. Cuticle with very slightly raised crossing lines, and covered with pale spots.

Hab. New Zealand.

13. *Gordius pachydermus*, n. sp.
(Pl. XVIII. fig. 7.)

Male, length 16–20 centim.

This species is especially distinguished by the thickness of its cuticle, which is covered with a great many more or less elevated papillæ of various sizes. No crossing lines are to be seen; and the cuticle appears almost structureless.

Body of a red-brownish colour, tapering continuously at the extremities, especially at the anterior. Semicircular depressions giving rise to a superficial segmentation. Tail of the male has two lobate very short processes, equally broad throughout their whole length, running almost parallel and not touching each other. The horseshoe-shaped thickening in the region of the genital aperture inconspicuous.

Hab. New Zealand (*coll. by the Rev. R. Taylor*).

14. *Gordius verrucosus*, Baird.
(Pl. XVIII. fig. 4.)

Gordius verrucosus, Baird, Catal. of Entoz. p. 36, t. i. f. 5; id. Proc. Zool. Soc. 1853, p. 20; id. Ann. & Mag. Nat. Hist. ser. 2, xv. p. 71; Diesing, Revision d. Nem. p. 602; Villot, Monogr. d. Drag. p. 60.

Female, length 16–50 centim., very variable.

Body black, covered all over with innumerable small raised warty papillæ, round and very stiff. Head small.

Hab. South Africa and Ceylon.

EXPLANATION OF PLATE XVIII.

Figs. 1–7. Structure of cuticle in the different species. (Object-glass $\frac{1}{3}$ inch.)

Fig. 1. *Gordius fasciatus*, Baird.
Fig. 2. *Gordius fulgur*, Baird.
Fig. 3. *Gordius subbifurcus*, Meissner.
Fig. 4. *Gordius verrucosus*, Baird.
Fig. 5. *Gordius gratianopolensis*, Charv.
Fig. 6. *Gordius diblastus*, n. sp.
Fig. 7. *Gordius pachydermus*, n. sp.

XXXIII.—*Notes on the Palæozoic Bivalved Entomostraca.* No. XII. *Some Cambrian and Silurian* Leperditiæ *and* Primitiæ *. By Prof. T. Rupert Jones, F.R.S., F.G.S.

[Plates XIX. & XX.]

Since the publication of my notes on Scandinavian, British, and North-American *Leperditiæ*, in the Ann. & Mag. Nat. Hist. ser. 2, vol. xvii. pp. 81–100, ser. 3, vol. i. pp. 244–257, and pp. 340–342 (1856–58), considerable additions have been made to the list of known species, and to some extent a revision of the members of the group has been carried out. M. Fr. Schmidt † has given a careful monograph of the *Leperditiæ* of Russia and neighbouring countries; and Dr. Lars Kolmodin ‡ has similarly treated those of his own country.

My esteemed friend M. J. Barrande has given us in his admirable 'Système Silurien du Centre de la Bohême' §, a perfect bibliographic history, as well of this genus as of some closely allied genera, as far as the date of his publication reaches; and, besides the descriptive details of the generic characters and an account of the new species discovered by himself in Bohemia, he has elaborated several most useful tables showing the geographical and geological range of the known forms of *Leperditia*, *Isochilina*, *Primitia*, and *Beyrichia*.

* For No. XI. see Ann. & Mag. Nat. Hist. ser. 4, 1875, vol. xv. p. 52.

† "Ueber die russischen silurischen Leperditien," &c., Mém. Acad. Imp. Sc. St. Pétersbourg, sér. 7, vol. xxi. (1873).

‡ 'Bidrag till Kännedomen om Sveriges Siluriska Ostracoder,' Upsala, 1869; and "Ostracoda Silurica Gotlandiæ," &c., Œfvers. Kongl. Vet.-Akad. Förhandl. 1879, no. 9 (Stockholm, 1880).

§ 1e partie: Recherches paléontologiques. Supplément au vol. i. Trilobites, Crustacés divers, et Poissons. 4to, Paris and Prague, 1872.